

REMARKS

In accordance with the foregoing, the specification has been amended and new claims 32-33 have been added. No new matter is presented in this Supplemental Amendment.

Effective with the entry of the Amendment After Final Rejection of January 26, 2006, and this Supplemental Amendment, claims 1-4, 6-7, and 24-33 are pending, with claims 1 and 24 being independent. Claims 1-4, 6-7, and 24-29 are under consideration. New claims 30-33 have not yet been considered. Claims 1-4, 6-7, 24-25, and 27-29 were rejected, and claims 1, 24, and 26 were objected to.

The specification has been amended to correct errors and to add an explicit definition of the term "primary grain boundary" based in an implicit definition of this term in Figs. 1A-1D and 2-10 and the description thereof in the specification as explained below.

It is respectfully requested that the arguments in the Amendment After Final Rejection of January 26, 2006, be considered.

In the final Office Action of November 1, 2005, claims 24, 25, 27, and 28 were rejected under 35 USC 102(e) as being anticipated by Oana et al. (Oana) (U.S. Patent Application Publication No. 2003/0071312), and claim 29 was rejected under 35 USC 102(e) as being anticipated by Oana (not Zhang et al. (Zhang) (U.S. Patent No. 6,451,638) as indicated) or, in the alternative, under 35 USC 103(a) as obvious over Akimoto et al. (Akimoto) (U.S. Patent Application Publication No. 2003/0197666) in view of Oana.

Arguments traversing these rejections were presented in the Amendment After Final Rejection of January 26, 2006. In response to these arguments, the Examiner states as follows in the Advisory Action of February 8, 2006:

The request for reconsideration has been considered but does NOT place the application in condition for allowance because: Applicant argues regarding claim 24 that "it is not seen where Fig. 5 of Oana shows "primary grain boundaries"". Applicant alleges that the boundaries shown in figure 5 cannot be considered "primary grain boundaries". However, the instant application does not explicitly define the term "primary" grain boundaries in a manner that would preclude the interpretation set forth in the Final Rejection.

However, the applicants presented detailed arguments in the paragraph beginning at the bottom of page 9 through the first paragraph on page 11 of the Amendment After Final Rejection of January 26, 2006, explaining why Fig. 5 of Oana does not show "primary grain boundaries" as recited in claim 24. It is submitted that the Examiner has not provided an adequate response to these detailed arguments in the Advisory Action of February 8, 2006, and it respectfully requested that the Examiner provide an adequate response explaining why these detailed arguments are not persuasive should he maintain the rejections of claims 24, 25, and 27-29.

Furthermore, in the Advisory Action of February 8, 2006, the Examiner did not respond to the following additional arguments presented in the second and third paragraphs on page 11 of the Amendment After Final Rejection of January 26, 2006:

Furthermore, the "[a]rea surrounded by primary grain boundaries" indicated by the Examiner on the marked-up copy of Fig. 5 attached to the Office Action includes four octagonal single-crystal grains and one square minimum-intensity area or amorphous silicon portion. Thus, even if this area identified by the Examiner were surrounded by "primary grain boundaries" as recited in claim 24 as alleged by the Examiner, it is submitted that this area does not contain "polycrystalline silicon grains" as recited in claim 24, and thus does not provide the feature "wherein polycrystalline silicon grains extend to the primary grain boundaries from an amorphous silicon portion in the area" recited in claim 24 as alleged by the Examiner.

Although the square maximum-intensity areas surrounded by the Type III boundaries may arguably be considered to contain "polycrystalline silicon grains" as recited in claim 24 in light of paragraph [0042], lines 1-8, of Oana as discussed above, the square maximum-intensity areas do not include "an amorphous silicon portion" as recited in claim 24, and thus do not provide the feature "wherein polycrystalline silicon grains extend to the primary grain boundaries from an amorphous silicon portion in the area" recited in claim 24.

It is respectfully requested that the Examiner respond to these additional arguments should he maintain the rejections of claims 24, 25, and 27-29.

Furthermore, with respect to the Examiner's statement that "the instant application does not explicitly define the term "primary" grain boundaries in a manner that would preclude the interpretation set forth in the Final Rejection," it is submitted that the instant application does in fact implicitly define the term "primary grain boundary" in a manner that precludes the

interpretation set forth in the Final Rejection because it is readily apparent from Figs. 1A-1D and 2-10 and the description thereof in the specification that a primary grain boundary is a boundary where polycrystalline silicon grains grown in different directions meet. For example, Figs. 1A and 1B show an example of a primary grain boundary where polycrystalline silicon grains grown from left to right meet polycrystalline silicon grains grown from right to left. Also, Fig. shows an example of primary grain boundaries where polycrystalline silicon grains grown outward from an amorphous region on one side of a primary grain boundary meet silicon grains grown outward from an amorphous region on the other side of the primary grain boundary.

A new paragraph explicitly setting forth this implicit definition of "primary grain boundary" has been added to page 8 of the specification, and new claims 32-33 respectively depending from independent claims 1 and 24 have been added to recite this feature.

Specifically, new claim 32 recites "[t]he polycrystalline silicon thin film according to claim 1, wherein each of the primary grain boundaries is a boundary where grains of polycrystalline silicon grown in different directions meet," and new claim 33 recites "[t]he polycrystalline silicon thin film according to claim 24, wherein each of the primary grain boundaries is a boundary where polycrystalline silicon grains grown in different directions meet."

It is submitted that the alleged "primary grain boundaries" identified by the Examiner on the marked-up copy of Fig. 5 of Oana attached to the Office Action of November 1, 2005, are not in fact primary grain boundaries as recited in claim 24 and new claim 33 depending from claim 24 because these boundaries in Fig. 5 of Oana are not boundaries where polycrystalline silicon grains grown in different directions meet.

As described on pages 10-11 of the Amendment After Final Rejection of January 26, 2006, there are three kinds of boundaries shown in Fig. 5 of Oana, which the applicants have designated Type I, Type II, and Type III boundaries for the purposes of this discussion. These designations do not appear in Oana.

A Type I boundary in Fig. 5 of Oana is a boundary between two octagonal single-crystal grains grown in different directions, and thus is not a "primary grain boundary" as recited in claims 24 and 33 because a "primary grain boundary" is a boundary where polycrystalline silicon grains grown in different directions meet.

A Type II boundary in Fig. 5 of Oana is a boundary between one octagonal single-crystal grain grown in one direction and one square minimum-intensity area denoted by a hatched square which is an amorphous area, and thus is not a "primary grain boundary" as recited in claims 24 and 33 because a "primary grain boundary" is a boundary where polycrystalline silicon grains grown in different directions meet.

A Type III boundary in Fig. 5 of Oana is a boundary between one octagonal single-crystal grain grown in one direction and one square maximum-intensity area denoted by a white square which may arguably be considered to contain polycrystalline silicon grains (although this is not entirely clear from Oana), and thus is not a "primary grain boundary" as recited in claims 24 and 33 because a "primary grain boundary" is a boundary where polycrystalline silicon grains grown in different directions meet.

For at least the reasons discussed above, it is submitted that Fig. 5 of Oana does not disclose "primary grain boundaries" as recited in claims 24 and 33.

For at least the reasons discussed above and in the Amendment After Final Rejection of January 26, 2006, it is respectfully requested that the various rejections of claims 1-4, 6-7, 24-25, and 27-29 over the prior art be withdrawn.

Conclusion

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.


Finally, if there are any formal matters remaining after this Supplemental Amendment, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this paper, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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